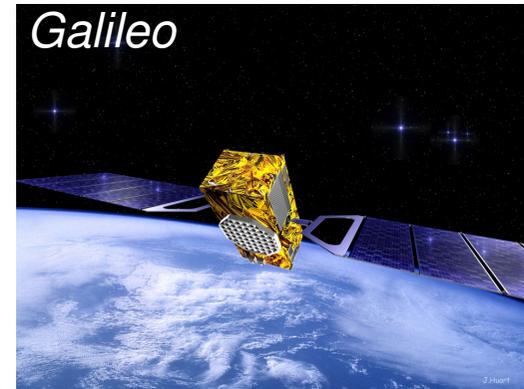




Results from ILRS GNSS Tracking Campaigns



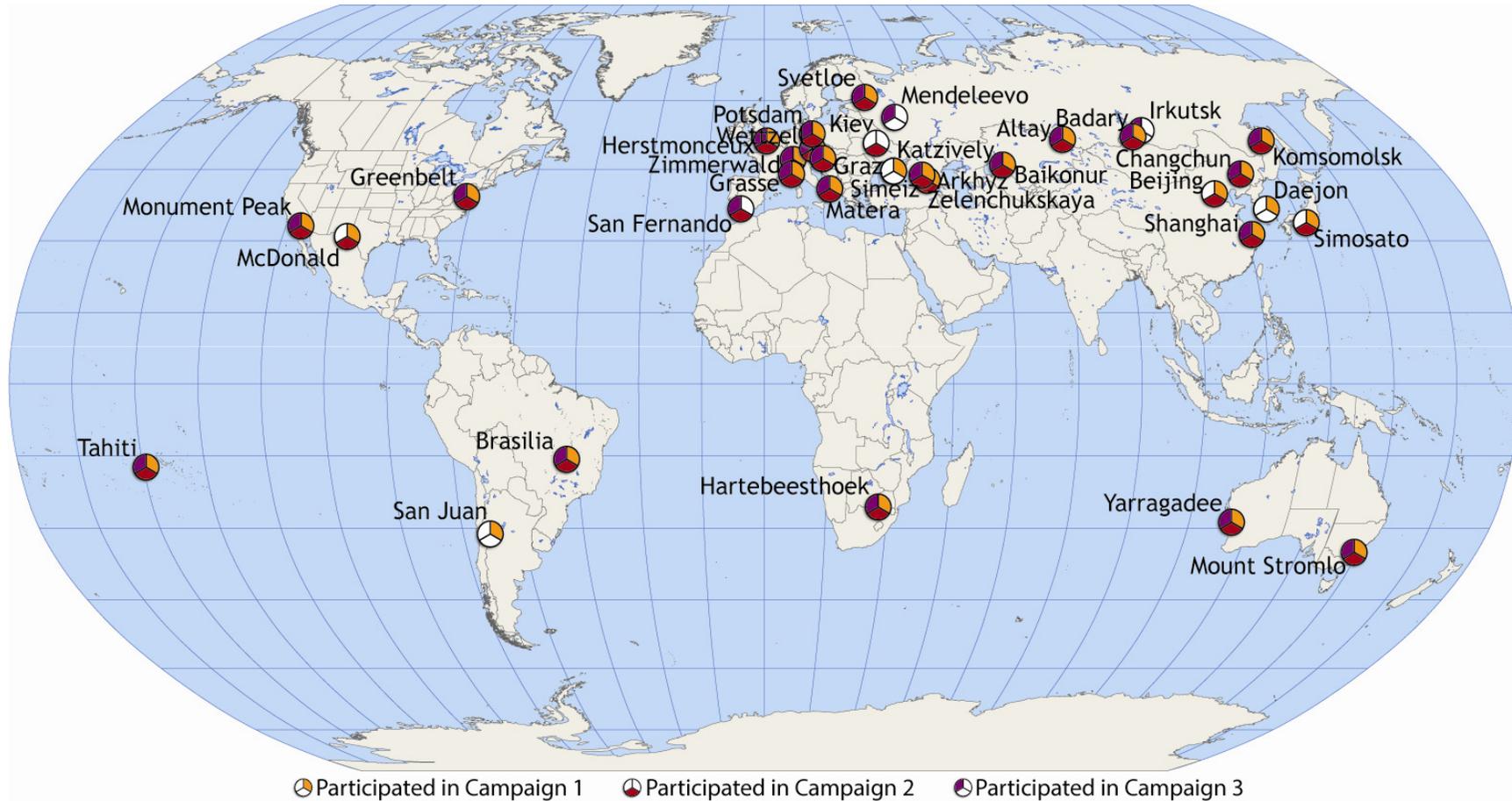
Mike Pearlman
Carey Noll
Mark Torrence
NASA GSFC

2015 ILRS Technical Workshop
October 26-30, 2015



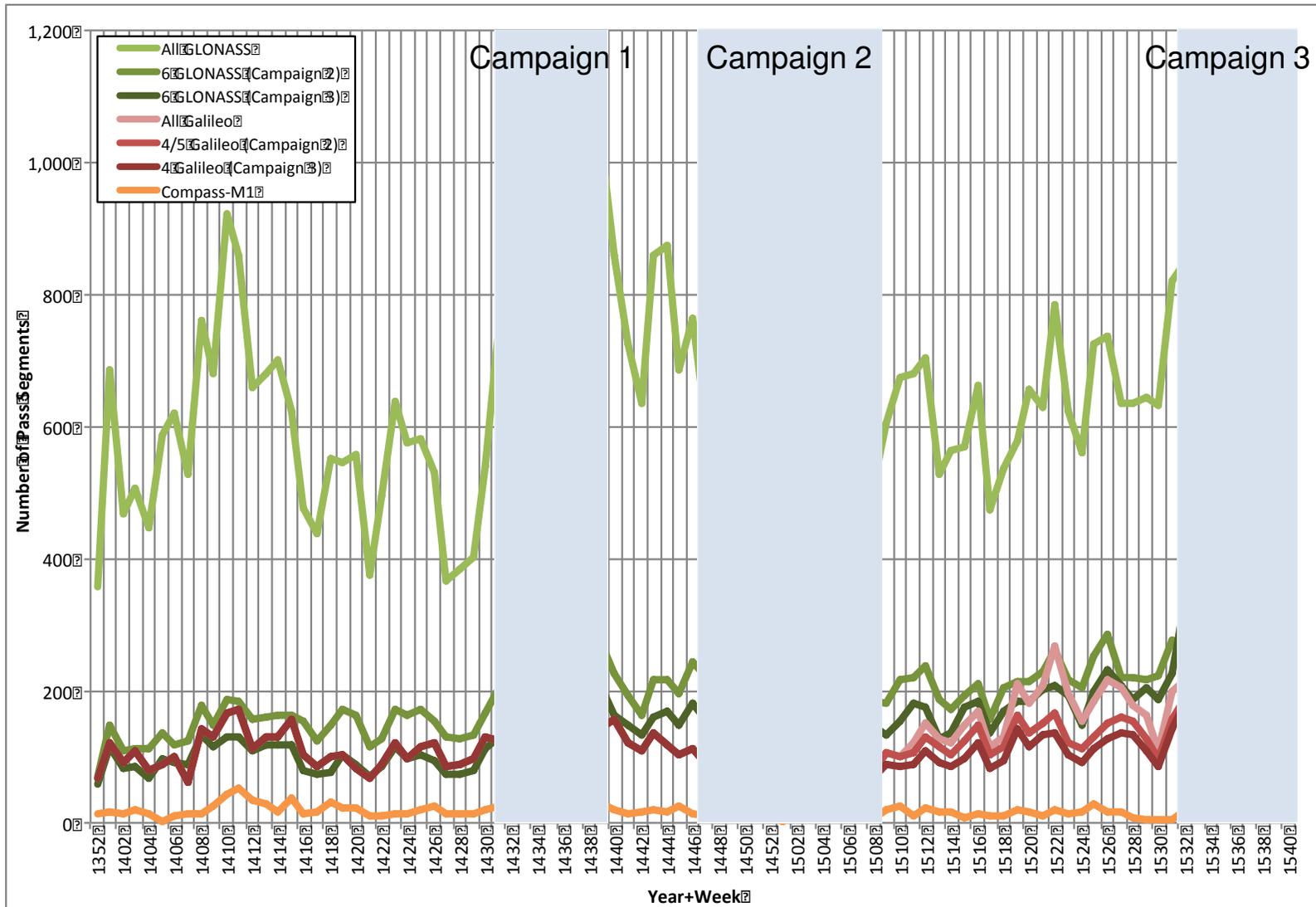
ILRS Network Participation

Campaigns 1, 2, 3





Weekly GNSS Tracking by Campaign Constellation





Campaign 1 Summary

August 01 – September 30, 2014 (2 months/8 weeks/61 days)

- Instructions:

- Track all GNSS satellites on current ILRS priority list (18 satellites); can track more if able (total of 33 satellites available, 24 GLONASS/5 Galileo/4 Beidou)
- Acquire three sets of two normal points distributed over that transit of each satellite; normal point includes 1000 FR points or last 5 minutes, whichever is shorter; no need to obtain more than 1000 FR points
- Cycle through all of the GNSS satellites (GLONASS, Galileo, and Beidou); and track the full cycle at least three times per week
- Attempt some daytime passes if conditions are favorable

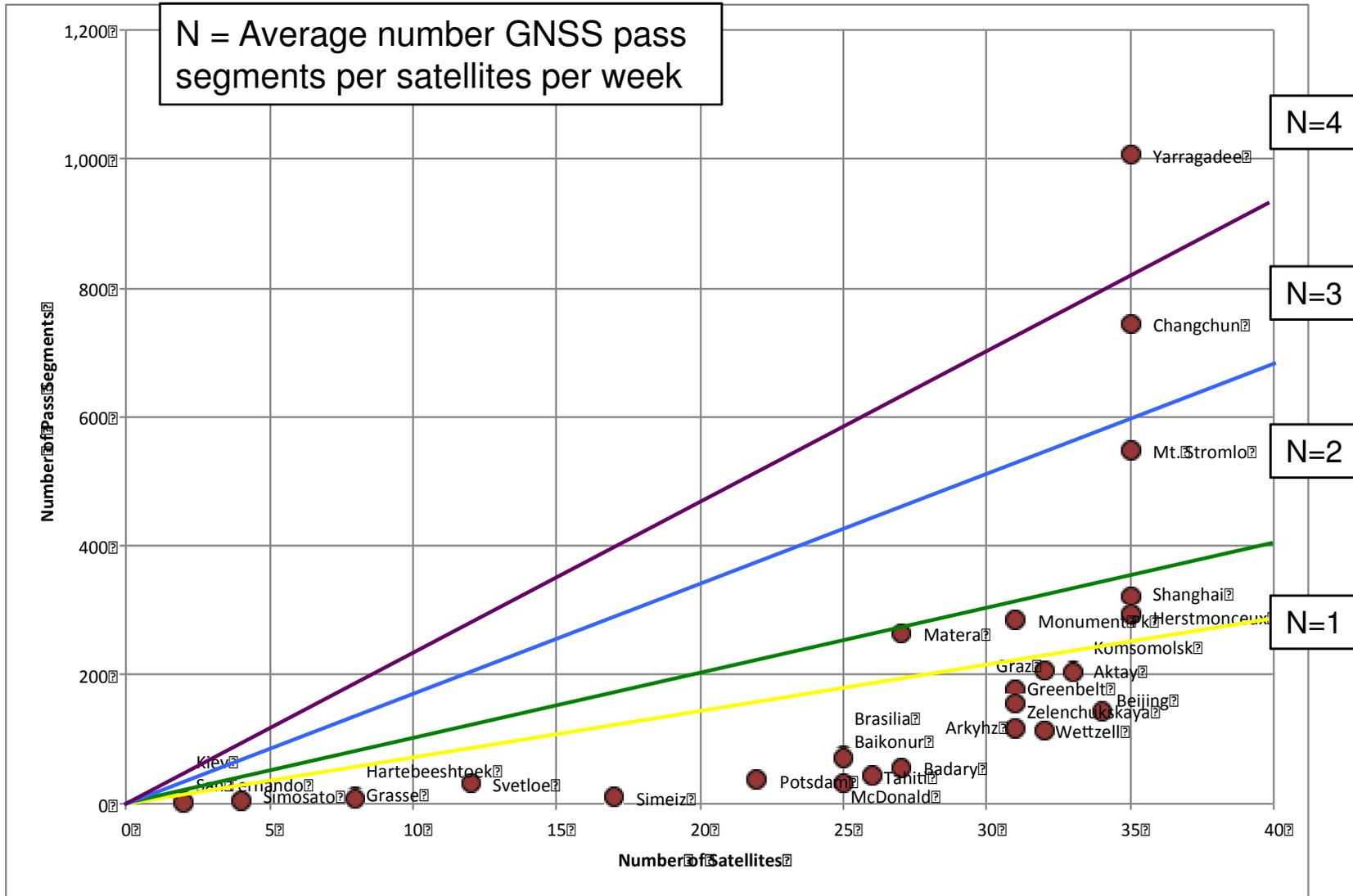
- Conclusions:

- Number of stations tracked all of the satellites
- Few stations tracked a thousand or more pass segments and a few thousand normal points
- Several stations averaged 2 – 4 passes a week on all of the satellites
- Largest data yield was achieved by the Yarragadee site
- Increased GNSS tracking did not appear to noticeably reduce LAGEOS and LEO data yield
- Few stations got more than one segment per pass
- Small amount of data in daylight



Campaign 1

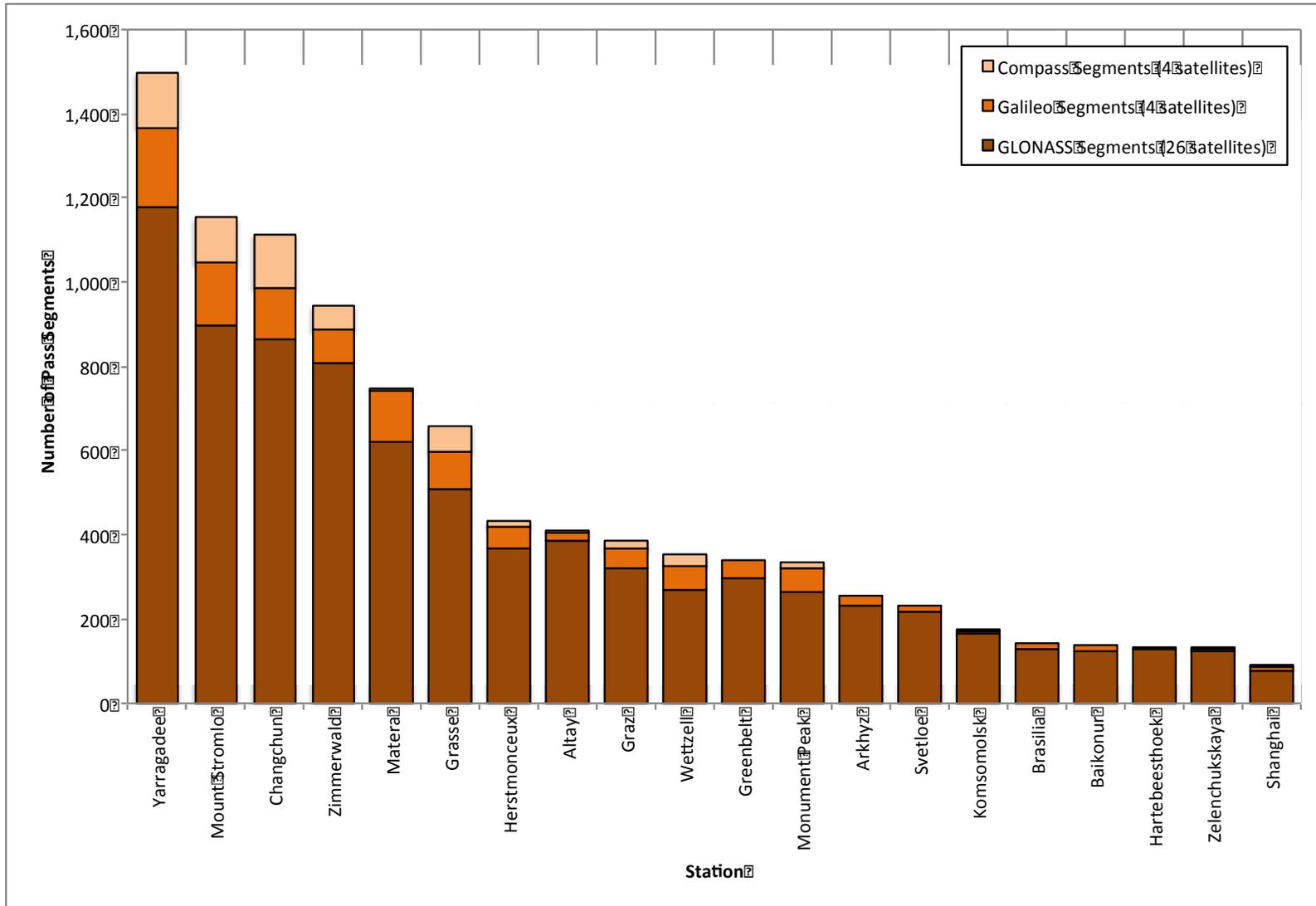
August 01 – September 30, 2014 (2 months/8 weeks/61 days)





Campaign 1

August 01 – September 30, 2014 (2 months/8 weeks/61 days)





Campaign 2 Summary

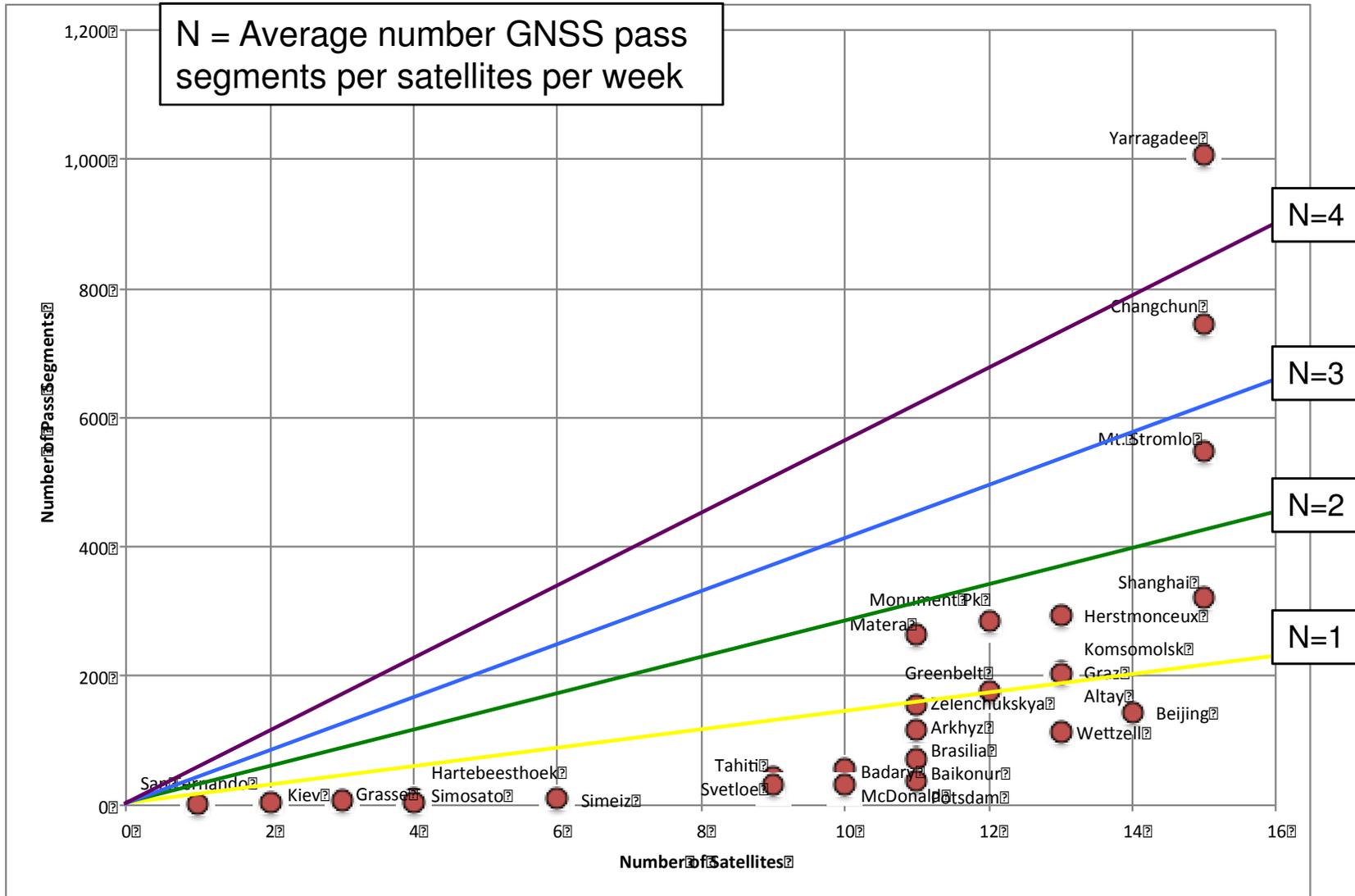
November 22, 2014 – February 28, 2015 (3 months/14 weeks/99 days)

- Instructions:
 - Track six GLONASS only: GLONASS-123, -125, -129, -130, -131, and -132 (first priority)
 - Track Beidou and Galileo as second priority
 - Tracking remaining GLONASS satellites as third priority
 - At minimum, stations obtain three segments along each pass, with three NPTs in each segment
 - Include daylight data, even if it is just a couple of hours after sunrise and a couple of hours before sunset
- Conclusions:
 - Some stations obtained 2 and 3 segments and daylight data on some passes
 - Need more sectors covered for the six higher priority GLONASS satellites and Galileo and M class Compass satellites. More important to get 2 and 3 sectors of data in the higher priority GLONASS satellites than to track the lower priority GLONASS satellites
 - Need more data in daylight, or at least around sunrise and sunset



Campaign 2

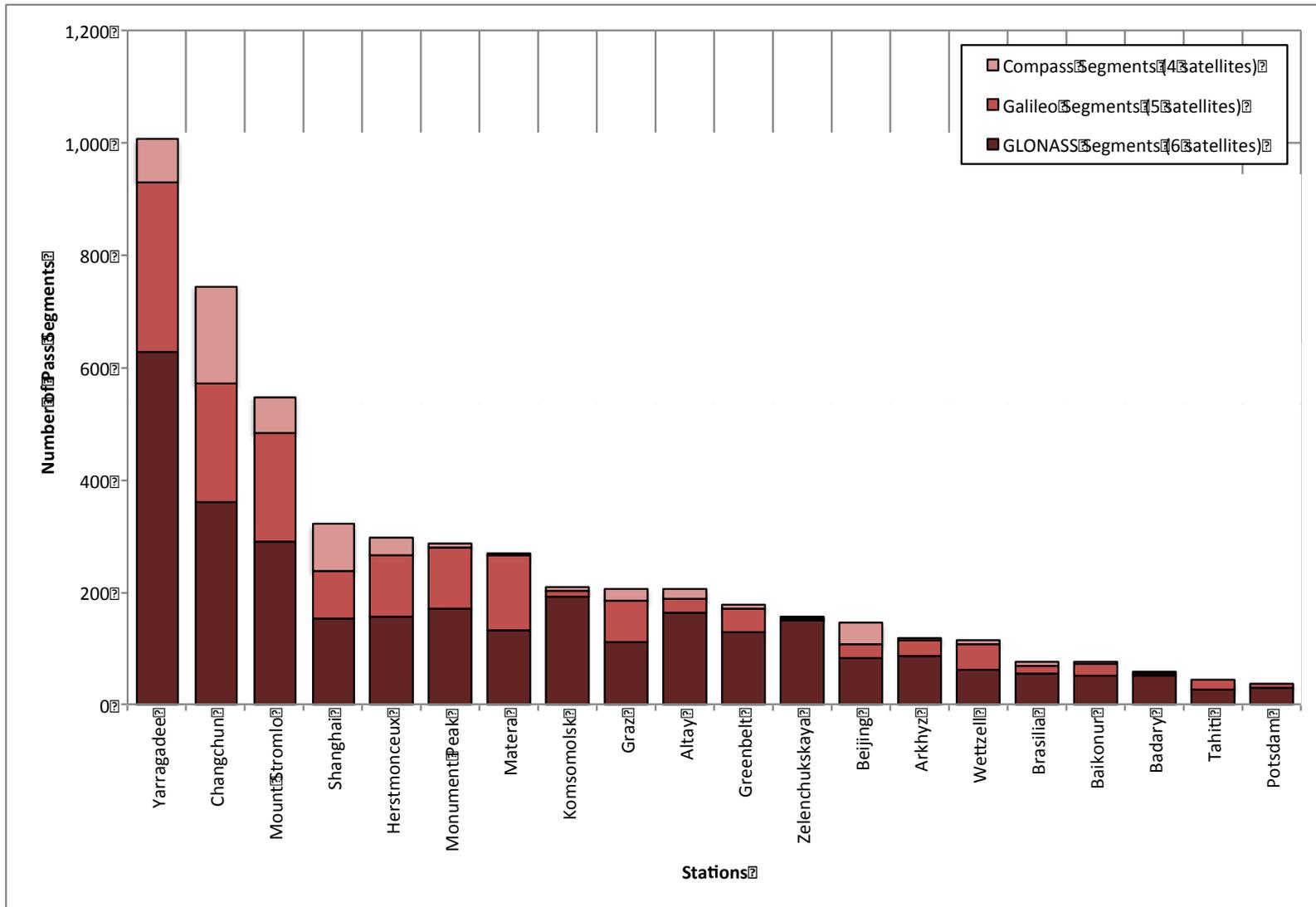
November 22, 2014 – February 28, 2015 (3 months/14 weeks/99 days)





Campaign 2

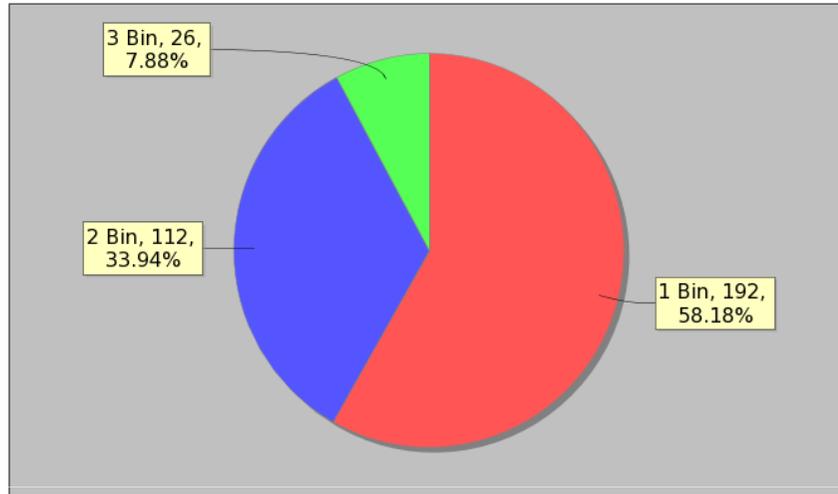
November 22, 2014 – February 28, 2015 (3 months/14 weeks/99 days)



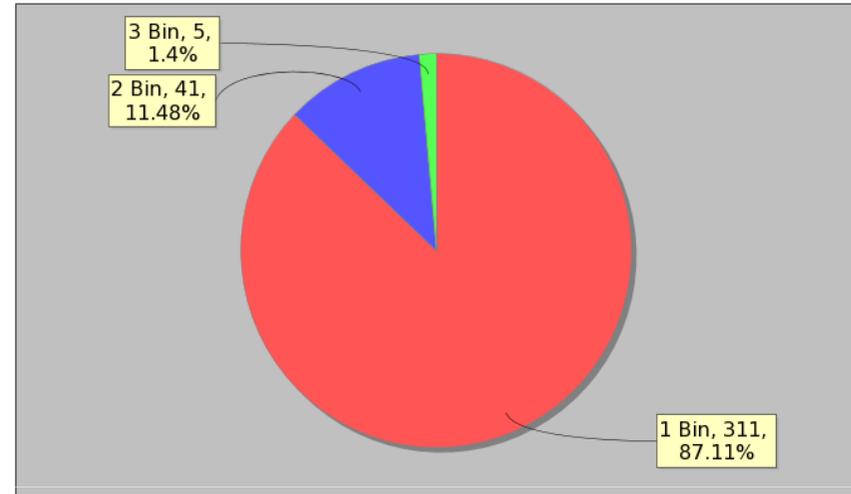


Campaign 2: Pass Distribution Analysis

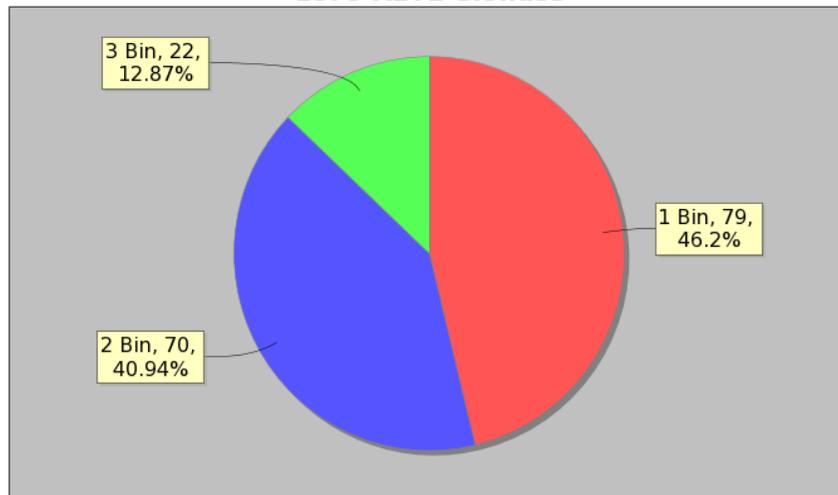
7090 YARL Glonass



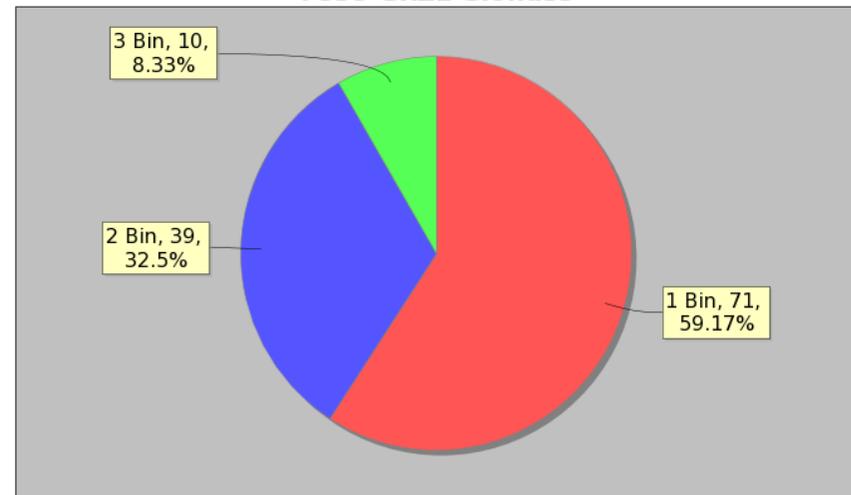
7237 CHAL Glonass



1879 ALTL Glonass



7839 GRZL Glonass

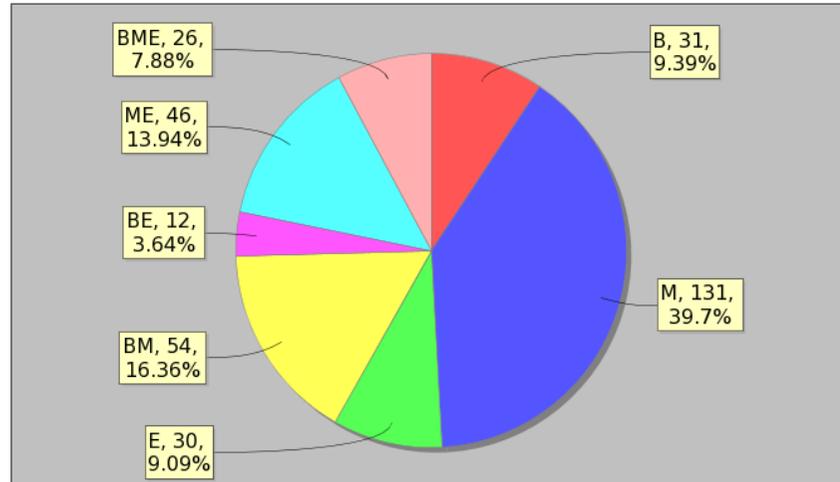


Percentage of the passes tracked that included one, two, and three segments for GLONASS.

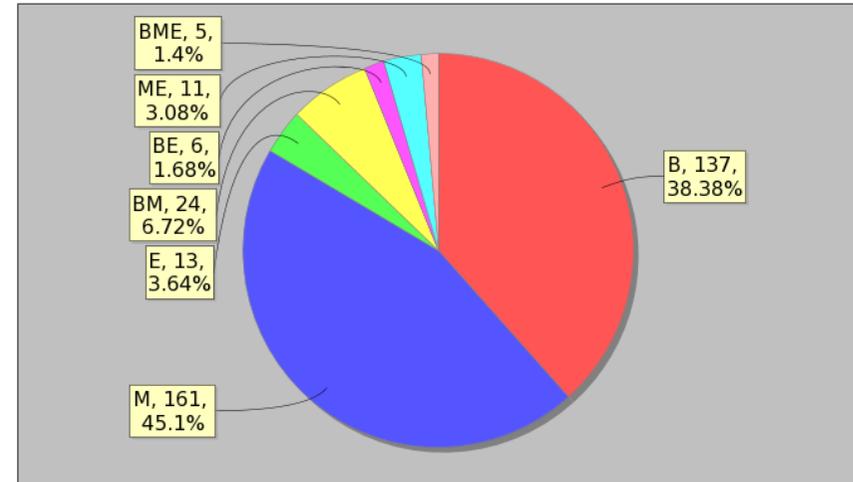


Campaign 2: Pass Distribution Analysis

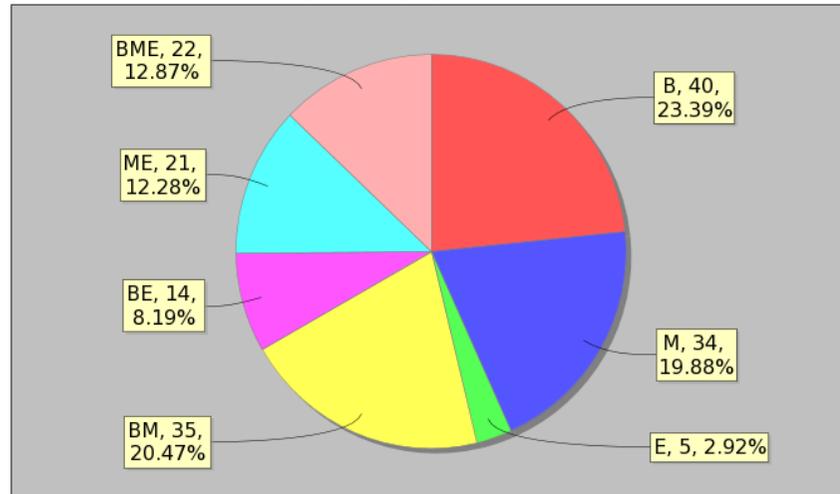
7090 YARL Glonass



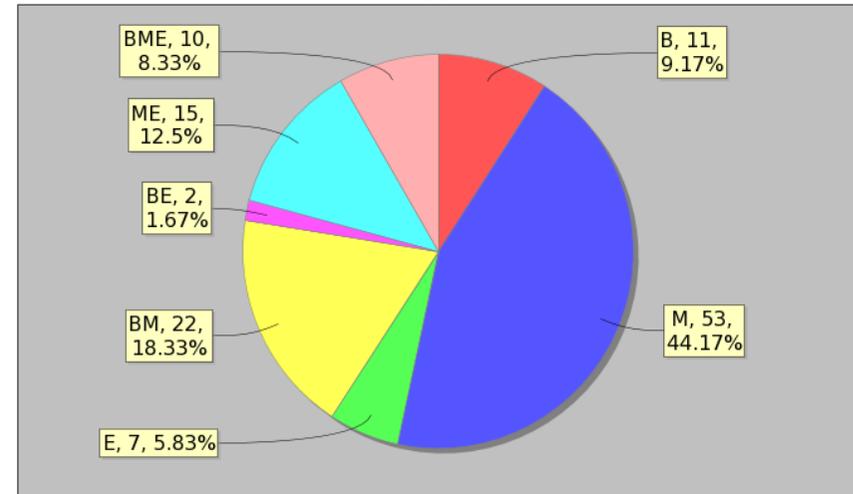
7237 CHAL Glonass



1879 ALTL Glonass



7839 GRZL Glonass



Percentage of the pass segments distributed within pass (B-beginning, M-middle, E-end)



Campaign 3 Summary

August 20 – October 16, 2015 (2 months/8 weeks/58 days)

- Instructions:

- Track six GLONASS only: GLONASS-123, -125, -128, -129, -133, and -134 (first priority)
- Track Compass-M3 and Galileo-101, -102, -103, and -104 (second priority)
- Tracking remaining GLONASS satellites as third priority but less important
- Obtain nine NPTs over the pass;
 - 3 during the ascending or early region of the pass
 - 3 in the central region of the pass
 - 3 in the descending or late region of the pass
- NPTs in each region may be taken together or separately whichever is better for your operation
- Obtain more daylight ranging even if it is around sunrise and sunset

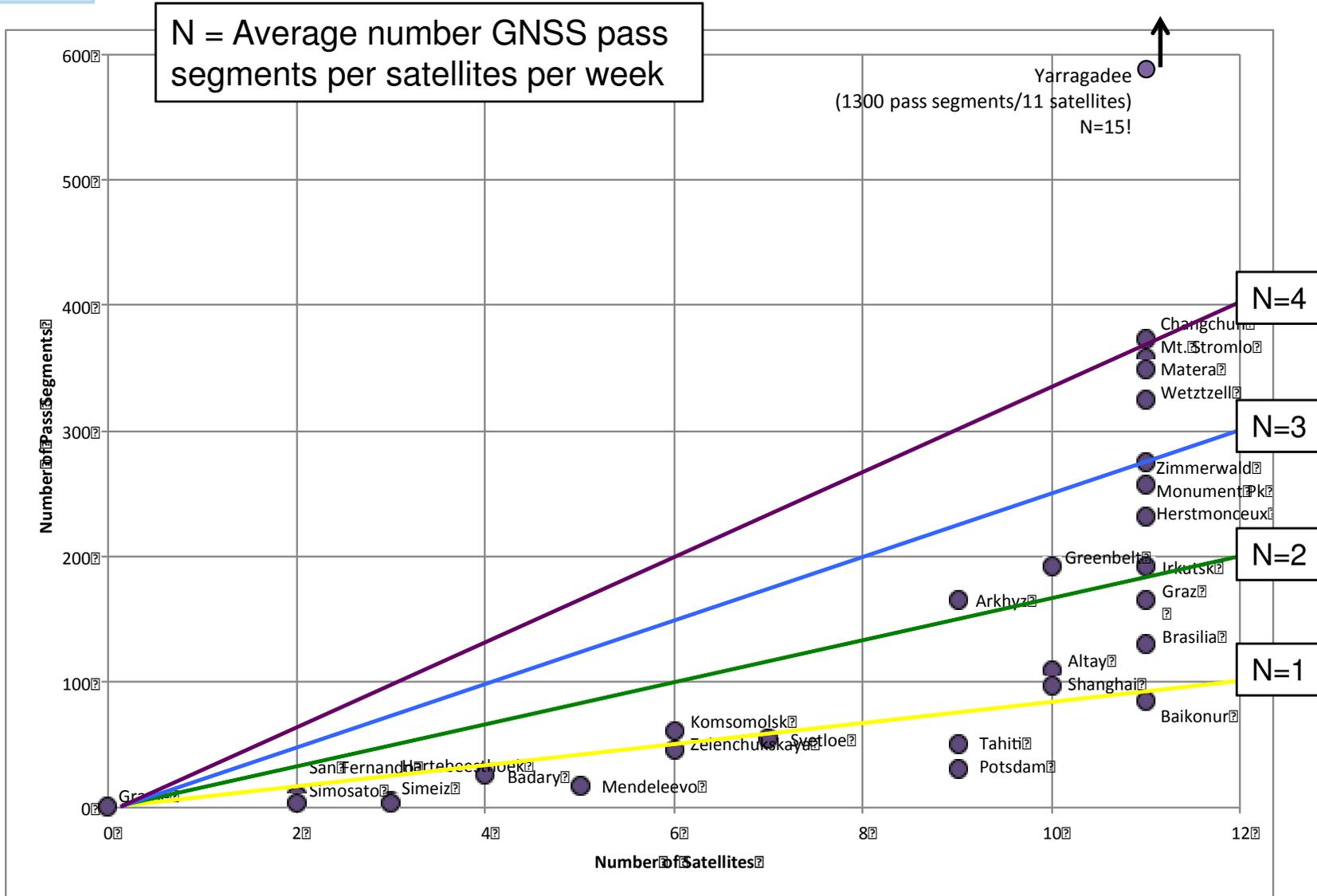
- Conclusions:

- TBD, but
- High data yields can be expected when conditions are very good
- Need more data in daylight, or at least around sunrise and sunset
- May have same issues as with previous campaigns



Campaign 3

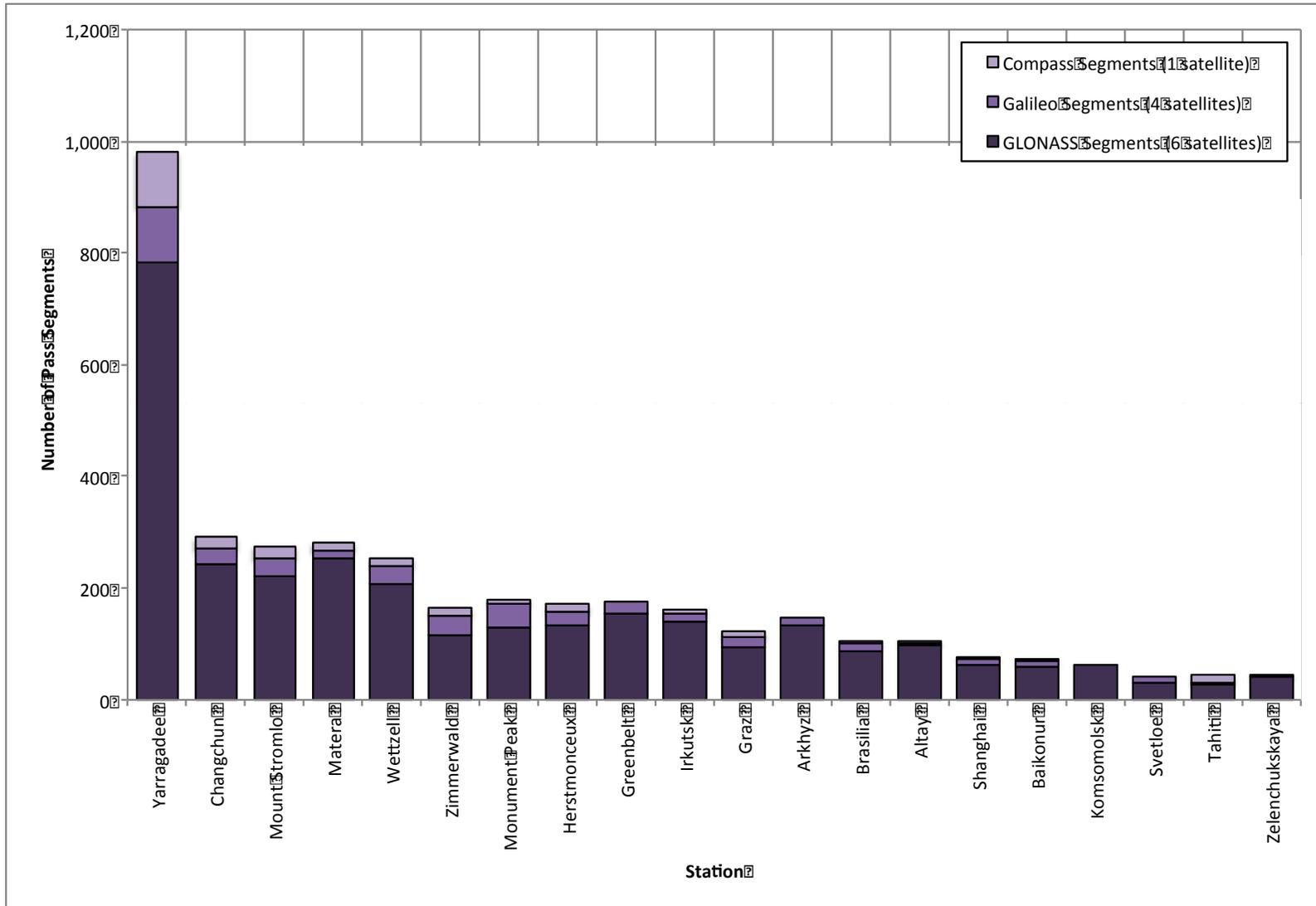
August 20 – October 16, 2015 (2 months/8 weeks/58 days)





Campaign 3

August 20 – October 16, 2015 (2 months/8 weeks/58 days)

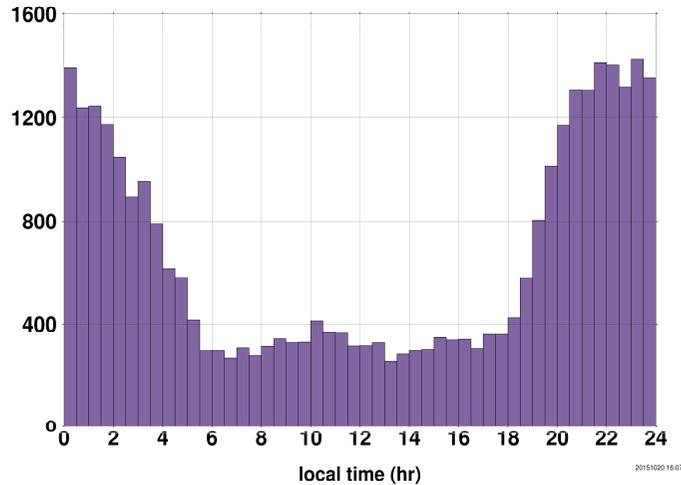




Tracking: Campaign vs. No Campaign

GNSS from 20150810 through 20151016

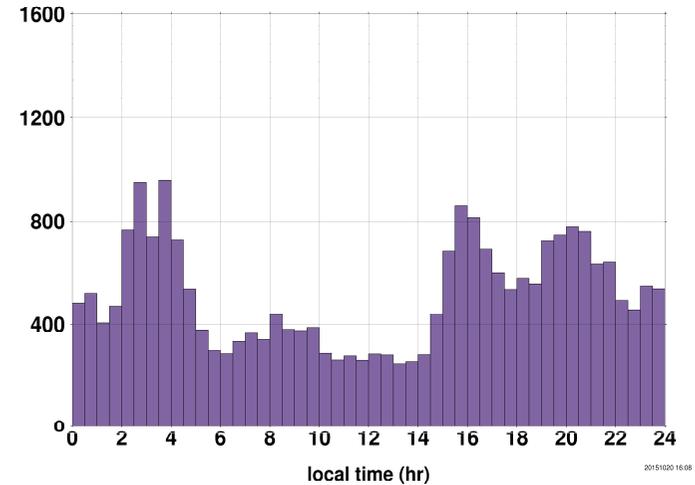
Number of normal points in half hour intervals. total points: 31,969



GNSS Campaign 3

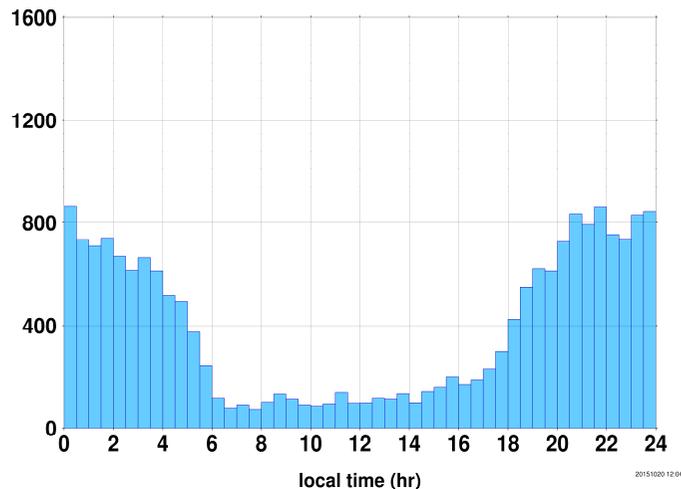
LAGEOS from 20150810 through 20151016

Number of normal points in half hour intervals. total points: 24,640



GNSS from 20141001 through 20141127

Number of normal points in half hour intervals. total points: 19,004



Non GNSS Campaign period

It appears that a GNSS campaign yields more data for both GNSS and LAGEOS. This trend is consistent for all three GNSS campaigns.

LAGEOS from 20141001 through 20141127

Number of normal points in half hour intervals. total points: 15,729

